

Aerosol and Land Surface Retrievals Using the Terra Multi-angle Imaging SpectroRadiometer (MISR): Methodology and Initial Results

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MISR, the Multi-angle Imaging SpectroRadiometer, is a new type of instrument on NASA's Terra spacecraft, which was launched on December 18, 1999. MISR measures upwelling visible radiance from Earth in 36 channels: 4 spectral bands centered at 446, 558, 672, and 886 nm, at each of 9 view angles spread out in the forward and aft directions along the flight path at 70.5, 60.0, 45.6, 26.1 degrees, and nadir. The data are being used to retrieve aerosol optical properties over land and water. The aerosol retrieval methodology involves estimating aerosol type and amount over 17.6 km x 17.6 km regions, along the entire pole-to-pole length of the instrument swath. Aerosol models consisting of mixtures of prescribed pure particles are compared with observations, and the best-fitting solutions are reported. Different algorithms are used over land and water.

Over land, the derived aerosol characteristics are used in an atmospheric correction algorithm to retrieve surface properties, including directional reflectance factors, albedos, and bidirectional reflectance model parameters. Initial retrieval results are available for several geographic areas and atmospheric conditions, including swaths in North America and Southern Africa. Comparison and analysis of the directional reflectance properties of different surface types will be presented.